

Disco I WorkSheet 4

September 14, 1998- Professor Broughton

Name: _____

Box #: _____

1. Associativity of products

1.a Let $\circledast = (1; 2; 3)(4; 5)$; $\bar{} = (2; 3)(4; 5)$; $^{\circ} = (1; 5)$: Compute $(\circledast \bar{})^{\circ}$ and $\circledast(\bar{}^{\circ})$: What do you observe?

1.b Compute $3(\circledast \bar{})^{\circ} = 3^{(\circledast \bar{})^{\circ}}$ and $3\circledast(\bar{}^{\circ}) = 3^{\circledast(\bar{}^{\circ})}$ step by step. What do you observe?

2. Let $\pm = (3; 4)$: Write down all the association schemes for $\circledast^{\circ}\pm$ and verify that two of them are equal.

2. Commutativity of Products

3.a Let $\alpha = (1; 2; 3; 4; 5)$; $\beta = (3; 5; 6)$. Does $\alpha\beta = \beta\alpha$?

3.b Next try to see if $\alpha = (1; 3; 5)$; $\beta = (2; 4; 6)$ commute.

3.c Write down a conjecture on commutativity of cycles. Offer at least 3 examples as evidence.

3. Powers

4 Let $\circledast = (1; 2; 3)$; $\overline{} = (6; 7)$ and $\circ = \circledast \overline{}$: Compute the powers $\circledast^n$; $\overline{}^n$; $\circ^n$ in a table format until you see a pattern emerge. What is the pattern?

5. Make a prediction if $\circledast = (1; 2; 3; 4; 5)$; $\overline{} = (7; 8; 9)$ and $\circ = \circledast \overline{}$: